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MICROSCOPY.¹

Marine Planarians.—In a paper now in press (Journ. Morph., Vol. IX, No. 2), Dr. Wheeler gives a few notes on methods he employed in the study of *Planocera inquilina*, a Polyclad found in the branchial chamber of *Sycotypus*.

The Biondi-Ehrlich stain proved to be very useful in making the rhabdites conspicuous.

Owing to the lack of pigment, the nervous system may be traced without difficulty, especially in young specimens. It agrees closely with Lang's description and figures of the nervous system of *Planocera Graffii*. Remarkably clear pictures of the beautiful plexus and its connection with the brain may be obtained by killing in hot corrosive sublimate, staining for 12 hours in Czokor's alum cochineal, and, after dehydrating, mounting in gum sandarac dissolved in absolute alcohol.

In a second paper, l. c., p. 178, devoted to a Triclad (*Syncoelidium pellucidum*) found in the gill-books of *Limulus*, the method of studying the nervous system is described thus:

The great transparency of *Syncoelidium* makes it a very favorable object for the study of the nervous system. The brain and main nerve trunks may be readily seen in the living animal, but this method is insufficient for a study of details. It is, however, only necessary to stain with alum cochineal, extract as much of the stain as possible with water, dehydrate and mount directly from absolute alcohol in gum sandarac to obtain a diagrammatically clear picture of all but the very finest details of the nervous system. The nerves stand out as white lines on a darker background.

Breeding Habits of the Three Triclad of *Limulus*.—*B. candida*, *B. propinqua* and *S. pellucidum* all deposit their egg-capsules on the gill-lamellæ of their host, *Limulus*. The first species seems to show no preference for a particular region of the gill-leaf, but scatters its egg-capsules over the whole surface. *B. propinqua* selects the basal, or proximal region of the leaf, while *Syncoelidium* prefers a small area near the edge and just lateral to a small marginal callosity which forms a brown line with the callosities of the adjacent leaves when the gill-book is closed.

The egg-capsule of *Syncoelidium* is about .75 mm. long, of an oblong shape and somewhat compressed. It is attached by a slender pedicel, .5 mm. in length, in such a way that one of the flattened sides of the capsule is applied to the surface of the gill-leaf. Usually the capsules

¹Ed. by C. O. Whitman, Univ. of Chicago.

are arranged with their long axes parallel to one another in a little cluster near the marginal callosity. The chitinous wall of the capsule is thin and transparent, but grows thicker towards the poles. Through it the two opaque white eggs or larvæ may be distinctly seen. I have never found more than two eggs in a capsule.

Many of the capsules bear at their outer ends one or more of the deep blue thecæ of an infusorium. These were regarded by Gissler as pneumatic tubes, but Ryder showed that they were the thecæ of "Protozoa of the genus *Epistylis* or *Zoothamnion*."

Both Ryder and Gissler figure the egg-capsules of *Syncælidium*. After describing the capsules of *Bdelloura*, Ryder says: "The second form, represented in Figs. 5-7, enlarged 16 times, is much smaller, but similar in structural features to the preceding. The capsules measure about $\frac{1}{15}$ of an inch in length and contain usually 2 eggs or embryos. At first the ova occupy each one of the ends of the capsule, as shown in Fig. 5; but after the young worms have developed somewhat, they usually lie alongside of each other lengthwise of the capsule. They frequently change positions, however, at this stage and it sometimes happens that there is but one embryo in a capsule."

Gissler's Fig. 2^b is evidently the capsule of *Syncælidium*, as shown by its size relatively to the infusorial thecæ attached to its summit.

For a description of the egg-capsule of *B. candida* I would refer the reader to the papers of Leidy ('51), v. Graff ('79), Ryder ('82a) and Gissler ('82).

What I take to be the egg-capsule of *B. propinqua*, is considerably smaller than that of the allied *B. candida*, measuring only 1.25 mm. It appears to contain only one ovum, instead of 2-7 as in *B. candida*, but on this point I cannot be positive. I am unable to identify this form of capsule with any of those described by Ryder ('82a).

The three *Limulus*-infesting Tricladæ differ also in their time of breeding. *B. candida* oviposits during May and early June, when the *Limuli* return from the deep water to the sandy beaches to breed. The passage of the Tricladæ from one crab to another must be favored by the prolonged coitus of the latter. *Syncælidium* oviposits in the latter part of July and the early part of August, when the gills are deserted by the half-grown young of *B. candida* for the basal joints of the cephalothoracic appendages. As the *Limuli* have laid their eggs and begin to return to deep water by the first days of July, it is necessary, in order to study *Syncælidium* and its habits, to collect a number of the crabs early in the season and to confine them in a large fish-box or similar receptacle. *B. propinqua* appears to breed at the same time as *Syncælidium*.